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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

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DATE MAILED: 12/17/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/460,638

Applicant(s)
Flugaur et al

Examiner
Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Sep 28, 2001
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent claim 11 requires the method of Claim 9, further comprising, "prior to said inserting, the steps of...", where independent claim 9 requires "the aperture having the device of Claim 1 therein, then...". It is unclear how the "device" can be both inside the chamber and outside the chamber.
3. Claim 11 recites the limitation "inserting" in claim 11. There is insufficient antecedent basis for this limitation in the claim.
4. Claim 15 recites the limitation "channel section" in claim 15. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. "...a length of a channel section..." Is not sufficiently descriptive to ascertain what applicant is claiming. In addition, there is insufficient antecedent basis for this limitation in the claim as described above.

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Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-14, 16, and 20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Foster et al (ESPIED. 5,665,640). Foster et al teach a device (item 58; Figure 2; col. 18 lines 33-59) and method for its fabrication comprising:

- i. an outer portion (items 271, 270; Figure 2B; col. 18 lines 33-59) comprising an electrically insulative material ("ceramic insulator"; col. 18 lines 42-43), having dimensions effective to prevent or inhibit plasma (col. 18, lines 33-58) arcing (col. 18 lines 50-58) to an electrically conductive surface (item 222; Fig.2B; col. 18 lines 50-58) of a plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53), and fit the plasma processing chamber aperture within a predetermined tolerance - as shown by Figure 2B, Foster et al teaches such a tolerance for the aperture (items 271, 270) as being the accommodating dimensions in supporting plates 272, 241, and 239.
- ii. an inner opening (item 256; Fig.2B; col. 18, lines 33-58), completely surrounded by the electrically insulative material of the outer portion, having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2)

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- iii. 2. A plasma processing chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, and located inside the aperture
- iv. 3. A method of making a plasma processing chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, the method comprising inserting (screws holding plates 272,239; Fig. 2B) the device of Claim 1 into the aperture
- v. 4. A method of processing a workpiece, comprising the following steps:
- vi. (A) exposing the workpiece to a plasma in the chamber of Claim 2
- vii. (B) transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- viii. 5. A plasma processing chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, and
- ix. a device inside the aperture, the device comprising an electrically insulative material and having:
- x. (I) dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture ; and
- xi. (ii) an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device

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- xii. 6. A method of making a plasma processing chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, the method comprising inserting a device into the aperture, the device comprising an electrically insulative material and having:
 - xiii. dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture, and an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device
- xiv. 7. The method of Claim 6, further comprising, prior to said inserting, the step of forming said aperture in said chamber
- xv. 8. A method of processing a workpiece (item 228; Fig.2B), comprising:
 - xvi. exposing the workpiece (item 228; Fig.2B) to a plasma in a chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface ; and a device in the aperture, the device comprising an electrically insulative material and having
 - xvii. (I) dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture ; and
 - xviii. (ii) an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device ; and

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- xix. (iii) transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- xx. 9. A method of operating a plasma processing chamber, wherein the chamber has at least one aperture therein and the aperture has an exposed electrically conductive surface, the method comprising the steps of:
 - xxi. (A) initiating a plasma in the chamber, the aperture having the device of Claim 1 therein, then
 - xxii. (B) cleaning (col.30; line 14) the chamber and the device (items 271, 270; Figure 2B; col. 18 lines 33-59; col. 18; lines 22-24)
- xxiii. 10. The method of Claim 9, wherein said plasma exists in said chamber for a predetermined period of time (col. 3, lines 1-7)
- xxiv. 11. The method of Claim 9, further comprising, prior to said inserting, the steps of:
 - xxv. exposing a workpiece (item 228; Fig.2B) to the plasma, and transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- xxvi. 12. A lower section (portion 270/271/256; Figure 2B) contained within 238/232 and an upper portion (portion 270/271/256; Figure 2B) outside of 238/232

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Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (ESPIED. 5,665,640). Foster et al teaches and orthogonal angle between an end of the device (256...Figure 2B) and the bottom of the device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the angle between an end of the device (256...Figure 2B) and the bottom of the device to be "non-orthogonal".

Motivation for making the angle between an end of the device and the bottom of the device to be "non-orthogonal" is drawn from the level of ordinary skill in the art where an angle other than 90 degrees would readily be considered obvious and would not significantly change the mode of operation of the Foster et al apparatus.

10. Claims 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (ESPIED. 5,665,640), as applied to claims 1-14, 16, and 20 above, and further in view of Bernard J. Curtis (ESPIED. 4,328,068). Foster et al does not explicitly teach deriving a physical signal from the device of claim 1 comprising a spectroscopic endpoint detection signal or a channel

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therefor. Foster et al does not teach the relative distance between a first length and "a length of a channel section".

Bernard J. Curtis teaches a spectroscopic endpoint detection signal and a channel therefor (34,36,32; Figure 3; column 2, lines 59-68). Additionally, Bernard J. Curtis teaches relative positioning of the "light pipe 32" such that it is not "too close to the substrate" (column 3, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Bernard J. Curtis spectroscopic endpoint detection signal and a channel therefor as part of the Foster et al apparatus.

Motivation for implementing the Bernard J. Curtis spectroscopic endpoint detection signal and a channel therefor as part of the Foster et al apparatus is drawn to the benefits as discussed by Bernard J. Curtis and directed to "determining the end point of the plasma etching process" (column 1, line 67 - column 2, line 5).

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Response to Arguments

11. Applicant's arguments filed October 5, 2001 have been fully considered but they are not persuasive.
12. That Foster et al's isolator sleeves "are dimensioned to fit the ceramic tray rather than a plasma processing chamber aperture as presently claimed." is not accurate. As supported by page 7 of Applicant's specification - "the present device (hereinafter, "channel sleeve") may comprise an outer portion (e.g., the "sleeve") with an opening or aperture therein." As such, Foster et al's isolator sleeve (items 271, 270) is both an opening and aperture in the device with an outer portion sleeve. Moreover, Foster et al's aperture convey's a "physical signal" in Rf power as required by claim 1.

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Conclusion

13. Applicant's amendment necessitated the new ground of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.


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